

LOCAL GOVERNMENT

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WORD PROCESSING

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Ontario Ministry of Intergovernmental Affairs

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To the Municipal Clerk:

Please circulate this bulletin or make copies for distribution to councillors or staff of your municipality who may be interested in the subject. Additional copies are available at fifty cents each from the Publications Centre (see page 23).

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WORD PROCESSING

INTRODUCTION

Word processing is the efficient and effective production of written communications by means of advanced office equipment. The equipment, invented by the IBM Corporation in the mid 1960s, is, in essence, a combination of computer and typewriter.

The equipment was created primarily to assist in increasing the productivity and efficiency of the administrative-support function (typist, administrative assistants, etc.). Where productivity had increased dramatically in the "producing" side of a business, it had not increased proportionately in the "office" side of a business.

One reason for limited success in increasing productivity in the office was the limited technological advancements in office machines, especially the typewriter. Until the invention of word-processing equipment, productivity improvement could be easily related to increases in the number of employees. As costs of the office took a greater and greater share of the total costs of the business, something dramatic had to be done. The use of word-processing machines, therefore, became a very tangible way of increasing output without significantly increasing costs.

Over the past ten years, where word processing has been introduced, 20 to 40 percent increases in productivity have been realized. Although these increases have obviously pleased management, the introduction of word processing has also had a profoundly positive influence on staff as well. In nearly every case, office-staff morale has increased. The operators realize that the boredom of repetitive letter-typing and massive text editing can be easily handled by machines, freeing them to do other administrative duties.

Although these assessments are derived from the private sector, there is nothing to suggest that similar improvements cannot also be achieved in the public sector. In fact, the experiences in the Regional Municipality of Peel and the City of Mississauga (described in detail later on in this bulletin) indicate even more positive results.

This bulletin is a basic outline of word processing, intended to enable the reader to be aware of word processing and to identify the various options available. It will describe the different kinds of equipment available, outline the advantages of word processing, note the various ways to obtain the equipment, and lastly, summarize the experiences of two municipalities in the use of word-processing equipment.

The "introduction" you are reading is typed on a conventional electric typewriter. The rest of the bulletin is typed on a word processor in order to show visually the difference between the two.

WHAT KINDS OF SYSTEMS ARE THERE?

Word-processing equipment, again, is simply a combination of computer and typewriter. All of the available hardware has some features that come from the typewriter and some from the computer.

From the typewriter side, each machine has a keyboard identical to the keyboard of a typewriter. In addition to the keyboard, though, there are other buttons known as directional keys that tell the machine what to do. This expanded keyboard is used like a typewriter by the operator. Each machine also contains a printer that, again, looks like the carriage on a typewriter. The printer may be attached typewriter fashion to the keyboard or it may be separate, connected only electrically to the keyboard.

From the computer side, the machine has a central processing unit (C.P.U.) which contains the logic that manipulates the information. Every machine also has an information storage medium to hold the information typed into it. This medium may be magnetic tape, magnetic cards, hard disk or floppy disk.

These four parts -- the keyboard, the printer, the C.P.U. and the storage medium -- are common to every word-processing system. The types of units available fall into one of two broad categories -- the stand-alone unit and the shared-logic or cluster unit. The main difference between the two is that the stand-alone has its own processing ability, while the shared-logic unit shares its processing power with a computer.

A. Stand-alone Word Processors

A typical stand-alone system consists of a single, separate work station that contains the four common parts in one unit. The unit can often be software programmed, usually by the supplier, and purchased as a package. It may have its own printer or it may share one printer among several units.

There are three kinds of stand-alone units.

1. Stand-alone Mechanical System

This system consists of a keyboard printer (usually a modified electric typewriter) that is coupled with control or direction keys. It has its own internal memory with magnetic medium (card, cassette, tape or disk). It has a printer that is used to generate type for editing purposes in draft form as well as finished documents.

2. Stand-alone Display System

This system consists of a keyboard, a cathode-ray tube (C.R.T.) which looks like a T.V. screen, and which replaces the traditional keyboard-printer, and a separate printer. In these systems, text is typed, edited and changed on the C.R.T. before the final finished document is printed. All display units enable the operator to see the type on the screen. The units incorporate additional logic to increase overall word-processing power; for example, allowing the operator to move paragraphs around or to insert one word for another automatically throughout the text. Most can also be software programmed.

3. Stand-alone "Thin Window" Display Units

These are similar to the full C.R.T. display units except they only have a one-line or partial-line C.R.T. These systems ease editing tasks and offer the operator a series of visual cues during the text-entry and editing process. For example, it can tell the operator how much space is left on the disc. They have the same other characteristics as the full display systems.

The electronic typewriter is sometimes confused with a basic word processor. Although it has some elements of a word processor, such as the ability to erase type from a page, it does not usually have off-line storage via a form of magnetic medium (tape, disk, etc.). It usually has a limited text-editing/entry capability, is less powerful and less expensive than the true word processor.

B. Shared-Logic or Cluster Word Processors

These systems share either the capability of a large and powerful C.P.U. or the processing power of a computer. Because of this arrangement, it is often difficult to tell a shared-logic word processor from a computer. The main difference is that shared-logic word processors are primarily designed to be word processors (thereby being relatively easy to operate) rather than a computer with word-processing capacities added on. The keyboard in these systems is identical to the keyboard of a stand-alone system.

Having a powerful C.P.U. enables the user to join several keyboards to one processing unit, thereby increasing the number of operations that can go on simultaneously. In some systems as many as 14 keyboards and/or printers can be hooked together in any design to meet one's special needs.

Shared-logic systems are particularly attractive to users with high volume and/or extensive document text-editing needs. These units can be placed in such a way as to accommodate any expansion in the future.

Because of its size and sophistication, a shared-logic system may not be as applicable to municipalities as the stand-alone unit. For that matter, most municipalities that have word processors in Ontario favour the display stand-alone type. Although the stand-alone may be preferable, many vendors may suggest the shared-logic system, especially for the larger municipalities that have their own computer. In fact, many computer vendors also offer word-processing equipment, thereby making word processors compatible with computers.

ADVANTAGES OF WORD PROCESSING

The big advantage of all word processors over the conventional typewriter is that they produce letter-perfect copy at speeds ranging from 100 to 540 words per minute. They can also produce type in many different formats, such as right-hand justified, by proportionately spacing the type to make it look similar to the layout in a book or magazine.

The single-line display or full-page display units enable the typist to edit the work visually and make any corrections before the final printing is done.

Being software programmed, as many word processors are, enables many features to be built into the typing process and this creates flexibility in meeting specific demands. Whole paragraphs can be moved at will. Any amount of information can be inserted, and the push of a button will automatically realign the text. Individual words throughout the text can be replaced instantaneously. Graphs, organizational charts and simple forms can even be drawn on the machine.

New and revised text can be blended with existing material, printed and then stored for future use. For example, address lists can be merged with customized form letters to make them look like originals. And while one job is being printed, many machines allow the user to type new text at the same time so that when the first job is completed, it will automatically print the next job.

Most systems are not at all complicated to operate and can be easily handled by existing staff after some training. With word processing properly implemented, productivity improvements can be seen in reduced re-typing time for error-free hard copy, ease in revising documents, faster output typing speeds, reduction in the amount of proof-reading required and in the levelling of peaks and valleys in the work, especially when dictation equipment is used.

Added to these demonstrated productivity improvements is increased staff morale, not only from working with modern sophisticated equipment, but from the realization that repetitive work requiring much revision can be done by the machine.

For municipalities, the greatest advantages may be in handling text such as council and committee agenda and minutes, standardised internal and external reports, repetitive outgoing letters and memoranda, processing of routine directives, maintaining and updating of address lists no matter how long, recording by-laws, establishing file plans and so on.

Although these features are all available currently, the number of applications that can be handled by a word processor may be limitless in the future. It is anticipated that, as new as word processing is today, it will become an integral part of the office of the future.

OBTAINING WORD-PROCESSING EQUIPMENT

There are basically four ways to obtain equipment:

- a) Rental from the supplier
- b) Partial pay-out lease from a third party
- c) Full pay-out lease from a third party or the supplier
- d) Outright purchase from the supplier.

Any one of these alternatives is possible for a local government. It is important, then, that the full range of rental, lease and purchase plans be evaluated before obtaining any equipment.

a. Rental from the Supplier

By renting from the supplier, the monthly charge is for the equipment during a fixed contract period. The contract usually includes full service coverage (maintenance package) during the normal working day.

The major advantages of the rental option are the cheaper cost at the outset and the short-term nature of the commitment, which does not tie you down to a particular piece of equipment.

Terms and conditions of any rental contract should cover:

- i) length of the agreement
- ii) services included -- installations, training, maintenance, and so on
- iii) renewal of the agreement, if any
- iv) termination of the contract when the time is up
- v) cancellation or breach of contract -- what happens when termination occurs prior to the time of the contract terminating
- vi) other items such as invoicing, advance payments, manufacturers' cancellation, trade-in allowances, equipment warranty, any special in-house electrical requirement, and so on.

In many rental agreements, equity accrual is possible enabling the user to receive a portion of the rental fee directed towards the eventual purchase of the unit.

b. Leasing

Although leases are available from either a manufacturer or a third party (independent rental agency) the arrangements are usually more flexible with a third party. Often a lower monthly rate as well as better ability to adapt to the user's special arrangements are possible.

There are usually two forms that leasing can take.

i) Operating or Partial Pay-Out

These leases are usually short-term in nature. The leasing company hopes that the contract will be renewed so that it can recover the full cost of the unit over time.

ii) Financial or Full Pay-Out

These leases are usually more long-term in nature and the maintenance is usually covered by a separate contract. At the end of the contract period, several options are normally available to the user:

- 1) To purchase the unit at a nominal cost;
- 2) To have reduced renewal rates on a subsequent contract;
- 3) To trade the unit in for new or different leased equipment;
- 4) To return the equipment to the leasing company.

However, in this financial payout alternative, generally the lease cannot be prematurely cancelled and represents a serious commitment to a product or product line.

c. Purchase

This procedure is straightforward. It does, however, have two variations, namely, that of buying the equipment outright or amortizing it over a period of time. Which option to choose really depends on which arrangement is financially advantageous to the purchaser.

DOES MY MUNICIPALITY NEED WORD PROCESSING?

This question can only really be answered by knowing precisely the kinds of work done in your office by each typist. Besides the variety of work, you must also know what volume is produced for each type of work. Based on these two kinds of information, a decision on whether word processing is for you can be made.

Getting this kind of information is not easy, and may indeed require the actual counting of material typed over a period of time. But even without keeping a count, your office may be a candidate for word processing if your work involves repetitious letters, maintaining and editing textual material, mailing lists that must be continuously updated, extensive revisions to typed material, and so on.

Still, to know precisely what kinds of work could be more easily handled by word processing and whether you really need an in-house unit, there is really only one way to do it. You must observe, examine, and count the types and volumes of documents produced over a set period of time (usually two weeks is enough). The more carefully this information is obtained, the better will be your assessment of your word-processing needs.

After you have these facts, ask yourself which departments need the machines. Should they be located in the one with the greatest need, with each of the other departments bringing work to it as necessary? Should a word-processing centre be established so that every department can use it equally? If you opt for the centre, where should it be physically located and to whom should it report organizationally? Are there any physical restrictions in the organization that would inhibit a word-processing operation, such as building layout, office organization, adequate power source, and so on?

After all this kind of information is obtained, it will give you the base you need to understand the areas of your operation to which word processing can apply, and help you establish what services word processing can handle.

Then, and only then, are you ready to evaluate the hardware available. Each vendor must know your needs to be able to suggest the right kind of equipment to meet your requirements.

EXPERIENCE OF THE REGIONAL MUNICIPALITY OF PEEL

At present, Regional Peel has word-processing machines only in the Clerk's Department. The first machine, obtained in 1974, was an I.B.M. Magnetic Card Typewriting System. This was upgraded in 1976 to the Xerox 800 and the Department is currently using two Xerox 800 units.

Each unit consists of two pieces of hardware. One is the keyboard typewriter which doubles as an input device as well as the output printer. The other is the dual diskette tape storage Central Processing Unit. One diskette stores finished input while the other prepares drafts for editing purposes.

These Xerox 800 machines were acquired to handle the great amount of repetitive typing, as well as to improve the capacity to answer routine correspondence quickly. As an office technique, it has increased both the efficiency and effectiveness of the Clerk's operation.

Although both units are located in the Clerk's Department, they are able to accommodate work from other departments on a charge-back basis.

The Region is now considering another update, probably to a Xerox 850. This unit has a C.R.T. enabling the operator to edit the copy, visually, before it is printed. It also has increased storage as well as fast document access that can significantly increase typing productivity. But its chief feature is that it can be software programmed to permit more flexibility in document creation and revision. For example, with this unit the machine can automatically change a name or word in a document every time it appears; add, delete, change or move words, lines, paragraphs or whole pages; and proportionately space the finished typing, to name just a few of its features. These features are not available with the Xerox 800.

Uses of the Xerox 800

The Xerox 800 handles virtually all of the form letters emanating from the Clerk's Office. Currently nearly 50 different kinds of form letters, such as notices of meetings and transmittal letters for legal agreements, are processed on these machines. They can "right-hand justify" all work to give the finished product a neater appearance.

Council and committee agenda and minutes are all typed on them.

They also handle routine planning-approval correspondence, especially those using standardized forms.

Financial information, especially that information which makes up the prospectus for debenture and bond issues, is word processed.

The Clerk's Policy Manual and the Region's Annual Financial Review Reports are on tape. These two documents require substantial revisions from time to time and are, therefore, ideal for these machines. In fact, any material that requires a great deal of revision, updating or amendments can be more easily handled on these machines than on a conventional electric typewriter.

Even though these other activities can be done by the machines, their main use is for routine correspondence and council and committee agenda and minutes.

Financial Arrangements

The equipment is leased and the lease runs for 60 months at a cost of approximately \$320 per month per machine. With this lease arrangement, the maintenance or service contract is built into the monthly charge. Where software programs can be used, Xerox offers them free. They also train the users as needed.

When the Region upgrades to the Xerox 850, these will also be leased.

Operation

Two operators have been trained to handle the equipment. The two of them, along with their supervisor, do all the work on the machines. Meticulous records are maintained by the operators on the amount of work done by each. These statistics are primarily used to calculate the cost of work produced on the machines. Therefore, all work for other departments can be easily costed and the original investment in the machines further justified.

At present, they are also handling work from the Finance Department, the Business Development Department, the Regional Archives and the Planning Department. In addition, all reference-library files are on tape. This shows the versatility of the machines.

Advice to Other Municipalities

Regional Peel has carefully assessed its word-processing needs and has maintained precise records on the output. Although it may not be necessary for every municipality to obtain this much information, Peel suggests that any interested municipality consider the following guides.

1. Do a detailed feasibility study to know exactly the kinds of work that would be handled by the machines.
2. Look at your long-term needs and obtain machines accordingly. Try not to satisfy only your short-term needs.
3. Know your requirements explicitly before going to the vendor.
4. Beware of salesmen selling you more than you need.
5. Take time to evaluate vendors.

6. Visit vendors on the short list at least twice, because the first time you may be overwhelmed by the technology displayed.
7. Take your own material to use on the machines as a demonstration, so you can fully understand whether the machines will do everything the vendor says they can.
8. Technology is constantly being up-dated, so above all be flexible in your choice in order to take advantage of any updating that may be necessary in the future.
9. Make enquiries of other municipalities that have word processors.
10. Subscribe to office publications such as Administrative Management and Office Systems. This can maintain your awareness of new technology.

Contact

For more information on the word-processing operation in this Region, please contact:

Mr. Larry Button
Clerk
Regional Municipality of Peel
150 Central Park Drive
Bramalea, Ontario
L6T 2V1

(416) 457-9400

EXPERIENCE OF THE CITY OF MISSISSAUGA

The City has used word-processing machines since early 1976. They were originally obtained to help the Clerk's Department handle the council and committee minutes, as well as the high volume of repetitive typing of such things as releases from subdivision agreements and draft by-laws.

The first machine leased was the Xerox 800. It served the purpose originally but as the workload increased, the machine could not handle it. The Xerox 800's limited flexibility and the fact that it does not have a C.R.T. led the City to re-evaluate its word-processing needs. In early 1977, the City leased the WANG System 20, but only after a feasibility study whereby the City matched its needs with the available hardware. The study was thorough and considered not only the hardware but also the various methods of acquiring the machines.

The WANG System 20 is designed for growing operations. It contains a C.R.T., enabling corrections to be made before printing, a dual diskette storage station that can be located under a standard office desk, and a floppy disc memory that can hold up to 80 pages of working memory on one disc and up to 120 pages of text-storage memory on the other disc.

The printer is bi-directional and gives letter-perfect print at 480 words per minute. It incorporates a silencer cover that muffles all sound when it is operating.

At present, there is one unit (a C.R.T. and dual diskette storage station) in the Clerk's Department and one in the Solicitor's Department. These two departments share one printer located in the Clerk's Department. Since these departments are next to each other, this is easily accommodated. The Planning Department, located in another building, also has a full unit, that is, a C.R.T., dual diskette storage, and a printer. The Treasury Department has also recently obtained a unit.

Other departments have access to the unit, but only at non-peak periods, by going through the Deputy-Clerk who is in charge of the machines in the Clerk's Department.

Uses of the WANG System 20

The units in the Clerk's and Solicitor's Departments process many items, among them:

- all repetitious outgoing letters
- all council agenda and minutes
- all committee agenda and minutes
- all standard tender documents
- all outgoing letters concerning property enquiries, such as zoning and assessment matters
- subdivision release agreements
- legal agreements

- some by-laws, especially those requiring a great amount of discussion and change such as the Procedural By-law and the Traffic By-law
- election reports
- street index.

Although the machines are versatile and handle a great variety of activities, the bulk of the work is the council and committees-of-council agenda and minutes. The minutes of committee meetings can be typed and stored on the disc for eventual final printing. After council approves the minutes, the final copy can be printed and distributed. It is in the cutting down of the number of draft typings that the machines are especially useful.

Financial Arrangements

The equipment is on a lease-purchase arrangement through the supplier. The lease runs for 36 months at a cost of \$615.75 per month for both the units in the Clerk's and Solicitor's Departments. After the lease runs out, the machines may be purchased, if the City wishes, or a new arrangement can be negotiated. Included in this price are certain software packages. If additional packages are needed, then they must be purchased separately.

As in any lease-purchase arrangement, the cost of the service contract is separate. This costs the City an additional \$119 per month for both units. All costs come out of the Clerk's budget for both units. The Planning and Treasury Departments arrange their own contracts separately.

Included in the arrangement is the training of staff. WANG prefers to train on-site and will accommodate any number of people who wish to learn the use of their machines.

Operation

There are six employees in the Clerk's Department who know how to use the equipment. They perform the work even for other departments which may want some production from the machines.

The City does not use forms to monitor workload or to calculate the cost-per-line of typing. It works on the premise that the word-processing machines are a service to the City as a whole, and no charge-back is necessary to the individual departments for City work.

The operators do not spend their time exclusively on the machines. They perform other clerical duties associated with a normal office environment. This enables the office to be flexible to meet peak demands.

Advice to other Municipalities

Although word processing is a relatively recent technological advancement in Mississauga, they suggest that the following points may help other municipalities considering investing in these machines.

1. Do a thorough feasibility study, outlining those activities that would be handled by the machines, before speaking to vendors.
2. Machines with a C.R.T. are far more efficient and effective than those without.
3. When visiting vendors, take the potential operators with you and have them try out the various kinds of equipment being considered.
4. Train several operators from the departments that will use the machines, but always have a senior operator who can liaise with the supplier and can help train the other operators especially with new software packages.
5. Encourage the operators to make suggestions as they gain experience on the machines. Often their suggestions can lead to additional uses as well as potential savings.
6. Investigate the service reliability of the vendor prior to selection. Often machine efficiency and effectiveness can be impaired by poor service.

Contact

For further information on the word-processing operation in the City, please contact:

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GLOSSARY

ATS (ADMINISTRATIVE TERMINAL SYSTEM)	An IBM software package that programs computers for word-processing applications.
CENTRAL PROCESSING UNIT (CPU)	The part of a word processor that consists of a core memory component, a calculations component, and an operating control component.
CRT	Cathode Ray Tube used in video-display terminals of electronic word-processing systems.
CURSOR	An indicator on the CRT marking the current point of text entry or edit operation.
DEDICATED SLAVE	A unit kept exclusively for one kind of work under the control of a master unit.
DIABLO	Trade name of a high-speed printer used in word processing.
DISK	A form of magnetic recording medium used to store data or information. See also "floppy disk".
DISK STORAGE	See "random access".
DISK DRIVE	Unit put on a disk so it can be randomly accessed for the purpose of editing and transcribing of documents. (Not to be confused with computer disk drive.)
ELECTRONIC KEYBOARD	A typewriter keyboard that operates electronically and, therefore, silently.
ELECTRONIC MAIL	Communications transmitted in digital code between distant locations and reproduced in paper format at the destination by means of computers, communicating word processors, facsimile, Telex/TWX, or Mailgram.
FLOPPY DISK	A form of magnetic recording media that permits random access to stored data, as compared with a rigid disk used also in computer memories. Also referred to as a diskette.
HARD COPY	A typed or printed document on paper.
HARDWARE	The devices and machines that make up the components of a word processor.

KEY STROKE	Physical depression of a key on a typewriter or input device that imprints a character onto the storage medium (mag card, disk, cassette, etc.)
MT/ST OR MAG CARD	Magnetic Tape Selectric Typewriter. An IBM electric typewriter with a memory capability.
OCR	Optical Character Recognition or optical scanner. A scanning device and magnetic ink character reader that permits direct input to and processing by the computer of bank cheques, airline tickets, and type documents, without human intervention.
PLAYBACK, PLAYOUT	The process of automatically typing out recorded text on a word processor or the process of listening to recorded dictation on dictation equipment.
RANDOM ACCESS	A disk storage technique in word processing and data processing that permits access to individual transactions randomly in a fraction of a second as compared with the serial nature of tape storage, thus potentially increasing the speed of output units.
REPAGINATION	An editing feature which helps the operator equalize the number of lines per page after a document has undergone final revision.
SHARED- LOGIC SYSTEM	A word-processing system in which operators at a number of keyboard terminals use the memory and processing powers of one computer's CPU simultaneously.
SOFTWARE	Programs or sets of instructions that control the word processors.
STAND-ALONE	A term applied to machines that operate independently and are not connected to other machines.
VIDEO-DISPLAY TERMINAL	A device similar to a television screen used to display information or data electronically when attached to a computer or to a word-processing system.
WORD-PROCESSING CENTRE	A centralized office area set aside for the production of typed documents by technicians operating automatic word-processing equipment.

WORD-PROCESSING SYSTEM

A planned interrelation of personnel, procedures, and equipment within an office environment or work specialization, and controls to facilitate the production of typed documents in a cost-effective manner.

WORD PROCESSING

The efficient and effective production of written communications through the combined use of systems management procedures, automated technology and accomplished personnel.

APPENDIXTEXT EDITORS

The following information in every case was supplied by the manufacturer or distributor involved. It was current as of April 1, 1979.

(This information is excerpted with permission from the magazine ADMINISTRATIVE MANAGEMENT, JUNE 1979, copyright 1979 by Geyer-McAllister Publications, Inc. New York, N.Y.)

STAND-ALONE UNITS

Manufacturer	Model	PRICE			COMMUNICATIONS COMPATIBILITY WITH (If Option, Price)			Features Video Display (If Option Price)	Text Capacity of Screen	Type of Medium and Capacity	Typing Printing Mechanism	Inquiry Card Number	Interfaces with Photocomp Equipment
		Basic No Options	Rent	Lease	Like Machines	Communi- cating Typewriter	Computer						
AM International	225	\$3,995	\$170	Yes		Yes				Mag tape cassette 120,000 char.	Selectric	165	
	425	14,500	575	Yes	Yes	Yes	Yes	Yes	54x80	Floppy diskette 256,000 Char.	Qume 55 cps		Yes
Artec International	Display 2000	\$9,950	320	Yes	Yes	Yes	Yes	Yes	37 char.	Diskette 163,000 char.	Metal Diablo	166	
Compal	80	9,775		255	Yes		Yes	Yes	1,024 char.	Floppy disk 350 pages	Daisy	167	
Compugraphic	MDT 400	4,275	Yes	Yes	Yes		Yes	Yes	1,280 char.	Minidiskette 87,000	Matrix printer	168	
	MDT 350	4,250	Yes	Yes	Yes			Yes	2,560 char.	Minidiskette 87,000	Matrix printer		Yes
Computek	Econotext II	5,950		Yes	Yes	Yes	Yes	Yes	1,920 char.	Dual Floppy disk	Qume	169	Yes
CPT	4200-II	6,295	250					Yes 2,795	14x96	Cassette 125,000 char.	Rotary II Selectric	170	
	4200-III	8,195	315					Yes 2,795	14x96	Cassette 125,000 char.	Rotary III Qume		
	8000	14,990	590		Yes		Yes	Yes	54x160	Floppy diskette	Qume		
	6000	10,990	440		Yes		Yes	Yes	21x160	Floppy disk	Diablo		Yes
A.B. Dick	Magna I	9,800	305		Yes	Yes				Mag card 5,000 char.	Qume Daisy	171	
	Magna II	11,000	305		Yes	Yes		Yes	32 char.	Mag. card 5,000 char.	Qume Daisy		
Digital Equipment	WS 78AA	9,995						Yes	1,920 char	Floppy disk 150 pages	Diablo Hy Type II	172	Yes
	WS 78CA	10,495			Yes	Yes	Yes	Yes	64x96	Floppy disk 150 pages	Diablo Hy Type II		Yes
Docuprint	DOC 5000	11,900			Yes		Yes	Yes	64x96	Floppy & mag card	Print crown	173	
IBM	6/420	9,390	350	310	Yes	Yes	Yes	Yes	8 Lines	Diskette	None	174	
	6/430	11,940	430	380	Yes	Yes	Yes	Yes	8 Lines	Disk/Card	None		
	6/440	24,000	800	705	Yes	Yes	Yes	Yes	8 Lines	Disk	Ink Jet 92 cps		
	6/450	27,300	910	800	Yes	Yes	Yes	Yes	8 Lines	Disk/Card	Ink Jet 92 cps		
	6/442	15,525	575	505	Yes	Yes	Yes	Yes	8 Lines	Disk	Qume 55 cps		
	6/452	18,825	685	600	Yes	Yes	Yes	Yes	8 Lines	Disk/Card	Qume 55 cps		
	6/240	10,300	370	325	Yes	Yes	Yes	Yes	8 Lines	Card	Qume 55 cps		
	Mag Card II	8,920	310	275	Yes	Yes	Yes			Card	Selectric 15.5 cps		
	Mag Card A	7,490	260	230	No	No	No			Card	Selectric 15.5 cps		
	Mag Card Executive	5,890	235	205						Card	Selectric 15.5 cps		
	Mag Card Selectric	5,400	195	170	Yes	Yes	Yes			Card	Selectric 15.5 cps		
Lanier	LTE-2S	14,900	525	Yes	Yes	Yes	Yes	Yes	2,040	Diskette 128 pages	Qume Daisy	175	Yes
	LTE-2D	16,400	565	Yes	Yes	Yes	Yes	Yes	2,040	Diskette 256 pages	Qume Daisy		Yes
	LTE 2S/LC	16,900	612.50	Yes	Yes	Yes	Yes	Yes	2,040	Diskette 128 pages	Qume Daisy		Yes
	LTE 2D/LC	18,400	650	Yes	Yes	Yes	Yes	Yes	2,040	Diskette 256 pages	Qume Daisy		Yes
	LTE-3D	13,990	500	Yes	Yes	Yes	Yes	Yes	2,040	Minidiskette 40 pages	Qume Daisy		Yes
	LTE-3S	12,490	470	Yes	Yes	Yes	Yes	Yes	2,040	Minidiskette 20 pages	Qume Daisy		Yes
Lexitron	911	5,000	339	175				Yes	8,250	Cassette Diskette	IBM Exec	176	
	913	7,500	485	345				Yes	8,250	Cassette Diskette	Qume		
	921	13,500	455	284	Yes	Yes	Yes	Yes	8,250	Cassette Diskette	Qume		
	942	17,950	550	425	Yes	Yes	Yes	Yes	8,250	Dual cassette Dual diskette	Qume		
	1101	9,995	350	295				Yes	2244/ 6732	Cassette	Qume		
	1102	13,850	485	395	Yes	Yes	Yes	Yes	2244/ 6732	Cassette	Qume		
	1201	9,995	350	295				Yes	2244/ 6732	Diskette	Qume		
	1202	13,850	485	395	Yes	Yes	Yes	Yes	2244/ 6732	Diskette	Qume		
	1303	15,500	550	450	Yes	Yes	Yes	Yes	2244/ 6732	Dual diskette	Qume		

STAND-ALONE UNITS

Manufacturer	Model	PRICE			COMMUNICATIONS COMPATIBILITY WITH (If Option, Price)			Features Video Display (If Option Price)	Text Capacity of Screen	Type of Medium and Capacity	Typing Printing Mechanism	Inquiry Card Number	Interfaces with Photocomp Equipment
		Basic No Options	Rent	Lease	Like Machines	Communi- cating Typewriter	Computer						
Megadata	2001	\$11,000	Yes	Yes	Yes	Yes	Yes	Yes	80x20	Floppy disk 250,000	Daisy	177	Yes
Micom	2000 Single Disk	13,500	570	Thru 3rd Party	Yes 1,800	Yes 1,800	Yes 1,800	Yes	8,000 char.	Floppy diskette 300,000 char.	Qume 45 cps	178	Yes
	Dual Disk	15,500	645										
NBI Corp.	System I	9,900	415	320				Yes	16 Line	Floppy disk 250,000 char.	Qume & Diablo 30-55 cps	179	Yes
	System II	15,490	595	455	Yes 2,000		Yes 2,000				Diablo 40 cps		
	System 3000	14,900	596	455	Yes 1,000		Yes 2,500						
Office Automation Techniques	Ultratext	22,500		Yes	Yes	Yes	Yes	Yes	1,920 char.	Floppy disk 50 pp	Diablo	180	Yes
Olivetti	TES 501	8,950			Yes 2,995	Yes 2,995	Yes 2,995	Yes	21 char.	Dual floppy disk 80 pp.	Olivetti Daisy	181	Yes OCR Scannable Print Wheel
	TES 401	5,990			Yes	Yes				Minidisk 4 pp.			
Phillips Business System	Norelco A	12,950			Yes 1500- 1800	Yes 2741 Compatible	Yes 1500- 1800	Yes	61 Lines	Mag card 50 Lines	45/55 cps	182	Yes-w/ Mag card Input Photocom
Q1	Lite	17,150		Thru 3rd Party	Yes 1,250	Yes	Yes	Yes	12x47	Floppy disk- ette & wided drive	Daisy 40 cps	183	Yes
	Mark II	11,450											
Quadex	210	10,000 w/line Printer		Thru 3rd Party	Yes	Yes	Yes	Yes	16,080 char. 19 lines	Floppy disk 290,000	Daisy wheel 45 cps or high speed line printer 200 cps	184	Yes
	240	25,750 Typesetter											
Qualterm	Tom	8,400- 15,000			Yes	Yes	Yes	Yes	24x80	Floppy disk 80-100 pp	Qume	185	Yes
Qyx	Level 1	1,650		58						1 Line internal		186	
	Level 2	2,750		99	Yes 500			Yes 850	1 Line	Internal 10,000 char.			
	Level 3	4,250		166						Internal 60,000 char			
	Level 4	5,750		240						Mini-diskette 60,000 char.			
	Level 5	7,750		323						2 Mini diskettes. 120,000 char			
Redactron	Redactor I	*A-3995 B-4495	165-323	Yes	Yes	Yes	Yes			Card. tape 160,00 char.	Selectric Daisy 40 cps	187	Yes
	Redactor II	9,995- 15,600	286-583	Yes				Yes	9,000 char	Card. tape diskette	Daisy 55, 300 cps line printer		Yes
Savin	950	7,995	295	207						Tape cart- ridge 30 pp	Qume 45 cps	188	
3M	Series 4000	12,500	440		Yes		Yes	Yes	18 Lines	Disk 75 pp.	Daisy	189	Yes
	System 84	12,500	453		Yes		Yes	Yes	24 Lines	Disk 100 pp	Daisy		Yes
Vydec	1200	13,900	535	465	Yes 600	Compatible w/2741	Yes 700	Yes	64x96	Floppy disk 250,000 char.	Daisy 45 cps.	190	Yes
	1400	14,700	575	500						Dual floppy disks			
	Text Station 1200	9,100	330	290						floppy disk single/dual			
	1400	9,900	370	325									
	Text Reader	19,500	1,195							Single floppy disk			
	0545 Text Printer	7,100	265	235							Daisy 45 cps		
Wang	5 Model I	5,900	221	221	Yes 1,000	Yes 1,000 Compatible w/2741	Yes 1,000	Yes	24x156	Diskette 325,000 cps	Option \$4,000 40 cps	191	
	II	7,900	296	296									
	III	9,900	371	371									
Wordplex	1-1	16,100	610	542	Yes	Yes	Yes	Yes	24x80	Floppy disk 70-100 pp	Qume 45 Cps	192	Yes
	1-2	17,500	660	590						Dual floppy disk 70-100 pp.			

STAND—ALONE UNITS													
Manufacturer	Model	PRICE			COMMUNICATIONS COMPATIBILITY WITH (If Option, Price)			Features Video Display (If Option Price)	Text Capacity of Screen	Type of Medium and Capacity	Typing Printing Mechanism	Inquiry Card Number	Interfaces with Photocomp Equipment
		Basic No Options	Rent	Lease	Like Machines	Communi- cating Typewriter	Computer						
Xerox	800 Single & Dual Card	Varies	Varies	Varies						Mag card 75x150	Daisy	193	Yes
	800 Single & Dual Tape									Cassette 35,000 char			
	800 Commu- nicating Single & Dual Tape				Yes	Yes	Yes			Cassette 35,000 char			
	850 Display Typewriter	12,900	425	375	Yes 150/Mo	Yes 150/Mo	Yes 150/Mo	Yes	24 char.	2 Flopy disks 600.00 char			
	850 Page Display	15,800	625	560					66x102				
	850 SPI	Varies	Varies	Varies	Yes	Yes	Yes	Yes		2 Floppy disks			
Xmark	Xmark 2002	15,500	620	340	Yes	Yes	Yes	Yes	24x80	Flopy diskette or hard diskette	Diablo or Qume NEC	194	Yes

SHARED—LOGIC TEXT EDITING SYSTEMS								
Manufacturer	Model	PRICE(S)			Physical Configuration	Peripheral and Additional Equipment Options (indicate prices of each extra unit)	Inquiry Card Number	Interfaces with Photocomp Equipment
		Basic Cost (No Options)	Rent	Lease				
CompuTek	Econotext Econotype Econotext II	\$23,500 24,500			5 CRTs, 2 floppy disks, communications and printer interface	Daisy printer-communications, 4 additional floppy disks @ \$6,200, paper tape reader and punch	195	Yes
Decision Systems Inc.	MicroWord	13,000	Various plans available		Intelligent terminals containing CPU controller and 64K bytes memory hard or floppy disks	Full and half duplex asynchronous communications	196	Yes
Digital Equipment Corp.	WS 200				PDP 8A 625 CPU can support maximum of 8 terminals, 4 printers and 3 communications lines, dual floppy drive and 2-5 megabyte disk drives	LA-78 high-speed printer, rough draft printer communications, OCR interface add-in-package — \$500	197	Yes
Edit Systems	Text Ed II Text Ed III Text Ed IV	30,000 11,200 11,900	Yes	Yes	Minimum—CPU keyboard, printer	Unlimited keyboard, high-speed printer, OCR, typesetters, mag tape converter	198	Yes
Four Phase Systems	Foreward			315 Station	4 CRTs, 400-pp. disks, 2 printers, communications controller		199	Yes
Jacquard	J 100 Video-computer	17,900			CPU and dual floppy disk, CRT and keyboard	Cartridge disks storage modules, line and character printers, communications	201	Yes
Office Automation Techniques	OAS 6			Yes	2-16 stations with full network capability	COM and OCR	202	Yes
Quadex	Typographer II Quadex 200	30,400 Varies	\$800	Yes	Up to 6 terminals and 3 printers	High-speed line printer OCR, computer input, mag tape, telephone modems	203	Yes
Wang Laboratories	Word Processor System 20	Varies			1 system diskette, 1 archive diskette, CRT work station, 40 cps printer		204	Yes
	Word Processor System 25	Varies			Up to 34 work stations and printers			Yes
	Word Processor System 30	Varies			10 megabyte hard disk drive, one archive diskette, workstation, 40 cps printer	Telecommunications, photocomposition, numeric keypad, twin sheet feeder, OCR		Yes
Wordplex	Wordplex 1	Varies			Processor & memory in one disclosure	1 or 2 floppy disk drives	205	Yes
	Wordplex 7 II	Varies			128K unit	Up to 300 disk drives, CDC line printer, 24 CRTs		Yes
Wordstream	2200 1200	37,236 30,962	Yes Yes		2 displays, 2 diskette drives, wide track and twin printers	Mag card reader and system console	206	No
World Information Systems	Terminal Data System	30,400		Yes		CRT, quality printer, line printer, OCR, card reader, tape disk drive & controller	207	Yes
Xerox	Visual Type 3	Varies			Multiple display keyboards and printer, fixed and removable disks	High-speed line printer, 80 megabyte disk drive, OCR magnetic tape drive	208	Yes

TIME SHARED TEXT EDITING SERVICES							
Vendor	Model	Basic Service Price (\$) - No. Opts.	Terminals Used in Customer's Office	Computer Facility	Photo Composi- tion	High Speed Printer	Inquiry Card Number
Bowne Information Systems	Word One COMSPEC Key Search	Based on usage	IBM CMC ST 2741 Redactron, Wang, Trendata, etc	Dual IBM 370/155	Yes	Yes	209
Proprietary Computer Systems	PCS/Text	Based on usage	Any communicating	Dual IBM 370/158	Yes	Yes	210
Tymshare	Augment	Based on usage	APPANET, terminals PDP 10 & 20 company's own terminal	PDP 10 and 20	Yes	Yes	211

This bulletin was prepared in the:

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